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CPC Program Library – individual request order form

Please list the program(s) required. Kindly check whether any program calls other CPC Library subprograms since these should also be listed.
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Magnetic tape specifications

The library programs will be sent as 80 character lines on half-inch, 9-track magnetic tape without a header label. Please indicate the mode in which the tape should be written. Please specify the requirements if the alternatives given are impossible.

Density: 800 characters per inch ☐ 1600 characters per inch ☐ 6250 characters per inch ☐

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Floppy disc

5.25 inch floppy discs written using PC-DOS software can be supplied. Please specify requirements.

Charge

In 1991 this is £15 per 1000 lines plus a basic charge of £25. For large orders distributed on high density magnetic tape the charge is £100 for the first 5000 lines and £15 per 5000 lines for the rest. This includes the cost of a tape (maximum length 600 ft. (180 m)) or floppy disc, handling and air-mail postage.

Electronic mail

The programs can be sent by electronic mail. If you require this service please give the network, network address and user identity. In 1991, the charge is £17 plus £15 per 1000 lines.

Program listings

If none of the above is suitable listings can be supplied. In 1991, the charge is £17 plus £2 per 1000 lines plus postage.

Method of ordering

If an official order from the requestor's institute is also enclosed the order will be dispatched immediately. Otherwise a proforma invoice will be issued and the programs dispatched when it is returned with the remittance. All payments should be made in sterling.

Neither the Library nor the Author of any distributed program guarantees that it is free from error or meets its published specification and cannot be responsible for any loss or consequential damage as a result of using it.

The requestor is asked to limit the distribution of program(s) to members of his group.

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The programs in the library are classified under the following headings:

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1.1 Cosmic rays
1.2 Nuclear processes
1.3 Radiative transfer
1.4 Radio astronomy
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1.6 Solar physics
1.7 Stars and stellar systems
1.8 Interstellar medium

2. Atomic physics
2.1 Structure and properties
2.2 Spectra
2.3 Experimental analysis
2.4 Electron scattering
2.5 Photon interactions
2.6 Other collision processes
2.7 Wave functions and integrals
2.8 Exotic atoms
2.9 Theoretical methods

3. Biology

4. Computational methods
4.1 Angular momentum coupling coefficients
4.2 Other algebras and groups
4.3 Differential equations
4.4 Feynman diagrams
4.5 Coulomb functions
4.6 Fourier transforms
4.7 Other functions
4.8 Matrices
4.9 Minimization and fitting
4.10 Interpolation
4.11 Quadratures
4.12 Other numerical methods
4.13 Statistical methods
4.14 Utility

5. Computer algebra

6. Computer languages, hardware and software
6.1 Hardware
6.2 Languages
6.3 Networks
6.4 Neural networks
6.5 Software

7. Condensed matter and surface science
7.1 Defects
7.2 Electron spectroscopies
7.3 Electronic structure
7.4 Experimental analysis
7.5 Mossbauer spectra (see 17.3)
7.6 Neutron scattering
7.7 Other condensed matter physics inc. simulation of liquids and solids
7.8 Structure and lattice dynamics
7.9 Transport properties
7.10 Collisions in solids

8. Crystallography

9. Data bases, data compilation & information retrieval

10. Electrostatics and electromagnetics

11. Elementary particle physics
11.1 General, high energy physics and computing
11.2 Phase space and event simulation
11.3 Cascade and shower simulation
11.4 Quantum electrodynamics (see also 4.4)
11.5 Quantum chromodynamics, lattice gauge theory
11.6 Phenomenological & empirical models and theories
11.7 Detector design and simulation
11.8 Detector control and data acquisition
11.9 Event reconstruction and data analysis (except data bases)
11.10 Accelerators and particle beams
11.11 Data structures and data base systems

12. Gases and fluids

13. Geophysics

14. Graphics

15. Laser physics

16. Molecular physics
16.1 Structure and properties
16.2 Spectra
16.3 Molecular vibrations
16.4 Experimental analysis
16.5 Electron scattering
16.6 Photon interactions
16.7 Elastic scattering and energy transfer
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16.9 Classical methods
16.10 Wave functions and integrals
16.11 Polymers

17. Nuclear physics
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17.3 Mossbauer spectra
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17.6 Experimental analysis – activity detection
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17.9 Optical models
17.10 Compound nucleus
17.11 Direct reactions
17.12 Pre-equilibrium decay
17.13 Coulomb excitation, electron scattering
17.14 Medium energy reactions
17.15 Spectroscopy – level scheme
17.16 Theoretical methods – general
17.17 Oscillator brackets
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17.19 Shell model – one-body problem, spectra
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17.21 Cluster model
17.22 Hartree–Fock calculations

18. Optics

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19.14 General plasma physics

20. Programming and publication practice

21. Radiation
21.1 Radiation physics
21.2 Radiative transfer

22. Reactor systems

23. Statistical physics & thermodynamics

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NEW OPTICS TITLES

Laser Handbook

Volume 6:

Free Electron Lasers

edited by **W.B. Colson, C. Pellegrini *and* A. Renieri**

1990 xviii + 508 pages
US $161.50/Dfl.315.00
ISBN 0-444-86953-0

The interplay between electric magnetic and the photon field have an intrinsic beauty and are deeply rooted in the fundamental understanding of nature. In this volume, edited by three major initiators in the field and containing contributions from experts belonging to the most advanced groups working on the subject, a first, comprehensive account of the Free Electron Laser is given. Chapters include both complete classical and quantum mechanical descriptions. Various types of experiments with intrinsic strong points and weaknesses are described while attention is also given to state-of-the-art experiments.

This book is not intended as a catalogue of on-going experiments, nor is it an attempt to prove that Free Electron Lasers are possible. It is the first large scale reference source from which all further publications on Free Electron Lasers will be based. It will therefore be indispensable for theorists and experimentalists interested in the fundamental aspects of these types of lasers.

Scattering in Volumes and Surfaces

edited by
M. Nieto-Vesperinas *and* J.C. Dainty

(North-Holland Delta Series)

1990 viii + 324 pages
US $89.75/Dfl.175.00
ISBN 0-444-88529-3

Inspired by a workshop on Volume and Surface Scattering, held in Madrid, Spain in September 1988, this volume contains contributions from leading experts in the field. It presents an exact picture of the subject and aims to stimulate interest by giving an account of the considerable progress made in this field over the past years.

Dealing with the subject of scattering and propagation from random media and rough surfaces, this book introduces new multiple scattering techniques, new experimental data, photon localization and enhanced backscattering.

Progress in Optics

Volume XXVIII

edited by **E. Wolf**

1990 xix + 438 pages
US $120.50/Dfl.235.00
ISBN 0-444-88439-4

Progress in Optics is a well-established series of volumes of review articles dealing with theoretical and applied optics and related subjects. Widely acclaimed by numerous reviewers as representing an authoritative and up-to-date source of information in all branches of optics, the series continues to fulfill a genuine need within the scientific community.

Contents: Preface. Digital holography-computer-generated holograms *(O. Bryngdahl and F. Wyrowski)*. Quantum mechanical limit in optical precision measurement and communication *(Y. Yamamoto, S. Machida, S. Saito, N. Imoto, T. Yanagawa, M. Kitagawa and G. Bjork)*. The quantum coherence properties of stimulated Raman scattering *(M.G. Raymer and I.A. Walmsley)*. Advanced evaluation techniques in interferometry *(J. Schwider)*. Quantum jumps *(R.J. Cook)*. Author index. Subject index. Cumulative index volumes I-XXVIII.

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COMPUTER PHYSICS COMMUNICATIONS INSTRUCTIONS TO AUTHORS * (ABBREVIATED VERSION)

Two classes of papers are published by Computer Physics Communications:

(i) Papers in the general area of computational physics and physical chemistry including research papers, notes, conference proceedings and review papers.

(ii) Write-ups describing programs to be held in the CPC Program Library † together with program adaptations and erratum notices.

Upon acceptance of an article, the author(s) will be asked to transfer copyright of the article to the publisher. This transfer will ensure the widest possible dissemination of information.

Computational physics papers

Papers for inclusion in CPC should not primarily be concerned with theoretical or experimental physics or with mathematics, computer science or information engineering but should be specifically relevant to computational physics and physical chemistry or to the computing needs of the physics and physical chemistry communities. Subject to this criterion CPC will publish descriptions of:

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Software, hardware and network techniques and facilities.
Mathematical, graphical and other subroutine libraries used in physics and physical chemistry.
Programs in a particular field of physics or physical chemistry.
Methods and programs associated with the design, running or analysis of experiments.
Languages and system programs of particular importance to physicists or physical chemists,

together with comments on manufacturers' hardware and software and on previous publications in CPC.

Computer programs in physics

The programs described should be of use to other physicists and physical chemists or illustrate new programming techniques which are of importance to some branch of computational physics or physical chemistry. Since they are intended for general application within the physics or physical chemistry communities they should be well structured and should meet accepted scientific programming standards. They should be written either in USANSI FORTRAN IV, FORTRAN 77 or ALGOL 60, or in some other language which has been adequately standardized and described in the literature and whose compiler is sufficiently widely available. Dialect statements and system or library subroutines which are restricted to a particular manufacturer or installation should be avoided if possible, or explained clearly.

Submission of manuscripts

All papers, program write-ups, adaptations and erratum notices should be sent in *triplicate* to a Specialist Editor in the appropriate field. All manuscripts must be in English and should be typewritten double-spaced with wide margins on good quality A4 or $8\frac{1}{2} \times 11$ in.^{2} (21.6×28 cm^2) paper. Figures must be suitable for direct photographic reproduction. Sections should be decimally numbered, and references indicated in the text consecutively by Arabic numerals in square brackets.

Programs

Usually, the manuscript for a program consists of the following:

(i) Abstract.
(ii) Program Summary *.
(iii) Long Write-up – a detailed description of the program: problem, method of solution, program design (with a flow diagram), operating instructions, input data, output (including error diagnostics), and the input data and selected output of up to three test runs. References should include a definition of the programming language if other than FORTRAN IV, FORTRAN 77 or ALGOL 60,

together with one copy each of:

(iv) Program Listings – the complete output from a compile–load–go job which adequately tests the program by means of up to three test runs. Not more than three pages of selected test results should be indicated for photographic reproduction in the journal to provide a check for the user and the printing should be clear enough to allow good reproduction. The complete program file including source code job control instructions and input data should be numbered consecutively in columns 77–80 starting with 0001. Columns 73–76 should be left blank. After acceptance for publication the Author will be asked to send this program file as card deck or (preferably) on magnetic tape to the CPC Program Library.
(v) Test Run Output – separate copies of the test results in a form suitable for direct reproduction in the journal or tables against which the output may be checked. Photographs of output from a high-quality printer or terminal are preferred.
(vi) Optionally, a program manual which readers may order from the CPC Program Library in hard-copy format.

Program adaptations

The manuscript to describe briefly an adaptation of a published program consists of:

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(ii) Adaptation Summary *.
(iii) Long Write-up,

together with one copy each of:

(iv) Listing of the adaptation file – this consecutively numbered file will later be required by the Program Library and consists of "new" statements plus comments to explain by reference to line numbers, how to modify the program file.
(v) Complete listing from a compile–load–go job with the modified program including test input data and selected results.
(vi) Test Run Output.

Erratum notices

The manuscript to describe corrections to a published write-up and/or program consists of:

(i) Erratum Summary *.
(ii) Explanation of corrections and if the program itself has been modified: one copy each of:
(iii) Listing of the correction file – this consecutively numbered file will later be required by the Program Library and consists of "new" statements plus comments to explain, by reference to line numbers, how to modify the program file or a new copy of the program.
(iv) Complete listing from a compile–load–go job with the corrected program including test input data and selected results.

Proof correction

Corrections other than the printers' errors may be charged for.

* A more detailed version of the Instructions to Authors and Program Summary Forms are available from the Desk Editor and are printed in Comput. Phys. Commun. 42 (1986) xv–xxiii.

† A description of the CPC Program Library is given in Comput. Phys. Commun. 42 (1986) xxv–xxvii. A complete index of programs is available from the CPC Program Library.

STATISTICAL PHYSICS TITLES FROM NORTH-HOLLAND

Fractals in Physics

Essays in Honour of Benoit B. Mandelbrot

A. Aharony and J. Feder *(editors)*

1990 xii + 400 pages (Paperback)
(Including many colour illustrations)
US $51.50/Dfl.90.00
ISBN 0-444-88646-X

First published as a special issue of the journal Physica D - Nonlinear Phenomena (vol. 38, 1989), this book contains the integral text of the proceedings of the conference "Fractals in Physics" held in Vence, France from 1-4 October, 1989. This conference was held on the occasion of the 65th birthday of Benoit B. Mandelbrot, the man who gave us the word "fractal".
Written by leading experts in this exciting field of research, the work is a very complete account of the history and current state of the science and the wide applications of the fractal concept. Competitively priced, this collection of essays aims at the individual "affectionado". Although the book is of broad interest, it is not so much intended for the uninitiated or superficial reader as for those who want to penetrate further into the secrets of this fascinating geometry of nature.

Statistical Models for the Fracture of Disordered Media

H.J. Herrmann and S.Roux *(editors)*

(Random Materials and Processes))

1990 xiv + 352 pages
US $102.75/US $180.00 (hardbound)
ISBN 0-444-88551-x (hardbound)
US $45.75/Dfl.80.00 (paperback)
ISBN 0-444-88550-1 (paperback)

Since the beginning of the century the technological desire to master the fracture of metals, concrete or polymers has boosted research and has left behind an overwhelming amount of literature. In a field where it seems difficult to say anything simple and new, the editors and authors of this book have managed to do just that.
The approach to fracture taken here was not conceived by mechanical engineers or material scientists. It is essentially the by-product of exciting developments that have occurred in the last ten to fifteen years within a branch of theoretical physics, called statistical physics. Concepts such as "percolation" and "fractals", as models for the properties of fracture are not often considered by engineers. A particular aim of this volume is to emphasize the fundamental role disorder plays in the breaking process.
The main scope of the volume is pedagogical and is at the same time an overview of fracture mechanics for physicists and an introduction to new concepts of statistical physics for mechanics and engineers. To this end the first half of the book consists of introductory chapters and the second half contains the results that have emerged from this new approach.

Hydrodynamics of Dispersed Media

Articles based on presentations made at the 4th EPS Liquid State Conference on the Hydrodynamics of Dispersed Media held in Arcachon, France, 24-27 May 1988

J.-P. Hulin, A.-M. Cazabat, E. Guyon and F. Carmona *(editors)*

(Random Materials and Processes)

1990 xvi + 296 pages
US $71.50/Dfl.125.00
ISBN 0-444-88356-8

The purpose of the 4th meeting of the liquid section of the European Physical Society was to contribute to a better communication between different scientific communities of fundamental and applied sciences dealing with random structures and processes. This should lead to an awareness of the relationship between geometries at different scales and physical behaviors.

The papers presented here show how one can go from a microscopic description to a phenomenological one by using hydrodynamical treatments and statistical ones (when disorder is present) as the mediators in this process of change of scales. This permits one to change from the microscopic description of a spreading drop at the nanometer scale to the study of a foam or of the wetting in random materials. In the same way, one can go from the microscopic properties at the interface of two fluids to the macroscopic dispersion behavior or from the interaction between two particles (or between a particle and a surface) to the rheology of a suspension.

Fundamental Problems in Statistical Mechanics VII

Proceedings of the Seventh International Summer School on Fundamental Problems in Statistical Mechanics, Altenberg, F.R.G., June 18-30, 1989

H. van Beijeren *(editor)*

1990 x + 396 pages
US $120.00/Dfl.210.00
ISBN 0-444-88432-7

Following in the tradition of previous summerschools edited by E.G.D. Cohen this book contains the lectures and one seminar given at the seventh International Summer School on Fundamental Problems in Statistical Mechanics. Most of the lectures are on recent developments in statistical mechanics. The following topics are covered: dynamical systems, phase transitions and critical phenomena, polymers and suspensions, spin glasses, kinetic theory of fluids and cellular automata, computer simulations in statistical mechanics.

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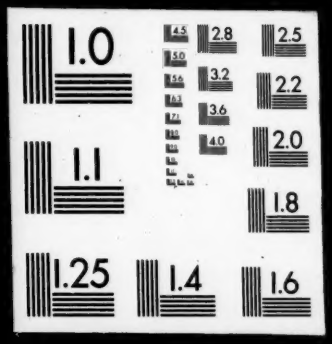
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